

CHAPTER 7

7.0 IMPLEMENTATION OF BENEFICIAL REUSE AND DISPOSAL PROJECTS

7.1 INTRODUCTION

Beneficial reuse involves the use of dredged material for a variety of purposes, such as habitat creation, rather than disposal as a waste. Reuse can help provide support and funding for these projects by building strong constituencies for the additional benefits beyond those of the dredging project. This has proven to be the case in the LTMS where there is a broad consensus among the various San Francisco Bay Area constituencies to support beneficial reuse as a cornerstone for the LTMS program.

Because of the strong commitment among the dredging and environmental community to support and implement beneficial reuse of San Francisco Bay dredged material, the LTMS agencies have determined not to implement allocations limiting in-Bay disposal, but instead to rely on the voluntary efforts of the various constituencies to implement the LTMS goals. Only if these voluntary efforts are not successful will the LTMS agencies implement allocations (Chapter 6).

Successful implementation of the LTMS is dependent on the availability of beneficial reuse sites for dredged material. The LTMS technical studies concluded that the following reuse options could feasibly provide significant capacity for material from Bay Area projects: (1) wetland habitat restoration in diked baylands; (2) facilities along the shoreline to rehandle, dry and/or process dredged material for use as landfill cover or other construction purposes (including confined disposal facilities); and (3) levee rehabilitation. Another reuse option not previously analyzed, but considered in this chapter, involves using dredged material at tidal areas to create sub-tidal habitat. Reuse opportunities around the Estuary are still limited, however, several sites now available are listed in Figure 7.1.

The LTMS studies determined that reuse projects are typically more expensive and difficult to implement than open-water disposal. However, large multi-user projects can achieve economies of scale and lower costs. Several large reuse sites are in the process of being implemented: the Hamilton Wetlands Project in Marin County and the Montezuma Wetlands in Solano County. The authorization of the Hamilton Wetlands Project in the federal Water Resources Development Act of 1999 provides not only for the cost of site construction, but also for the additional costs to bring dredged material to the site from federal channels. This will help overcome the cost-differential between open-water disposal and reuse. The Montezuma Wetlands Project proposes to accept and bury underneath the site, material that is unsuitable for aquatic disposal (although material will still be relatively clean and acceptable for use in the project). In

Figure 7.1 Existing and Potential Beneficial Reuse and Upland Disposal Sites

combination, these two projects alone should provide for implementation of the LTMS reuse goals, at least over the next decade.

Beneficial Reuse and Disposal Options

- Wetland habitat restoration
- Rehandling facilities and end-uses (e.g., landfill cover)
- Levee rehabilitation
- Sub-tidal habitat creation

Chapter 3 identified the steps involved with obtaining authorization to take dredged material to beneficial reuse sites. Chapter 7 focuses on the steps or issues (planning, engineering, environmental and regulatory) involved with the implementation of reuse projects.¹ Chapter 7 identifies potential reuse sites, constraints involved with implementation, and potential solutions. This chapter also reiterates information contained in the LTMS EIS/EIR that discussed in general terms potential impacts associated with the various reuse options; this

information is provided to inform potential project sponsors of the types of issues to consider and address during project planning and implementation. Chapter 7 also recommends certain measures and/or policy actions to be taken by the LTMS agencies and, in some cases, project proponents to facilitate implementation of beneficial reuse projects.

7.2 LTMS IMPLEMENTATION MEASURES

The following measures are proposed to achieve the goals of the LTMS as they relate to the implementation of beneficial reuse and disposal projects:

7.2.1 Project Planning Efforts and Site Selection

- The dredging and environmental communities will work to implement and fund beneficial reuse projects.
- To implement wetland restoration using dredged material, the BCDC and USACE will develop the Hamilton Wetlands project with the California Coastal Conservancy and all the LTMS agencies will continue to participate in the Hamilton Restoration Group.
- To facilitate selection and implementation of regional rehandling facilities and appropriate end uses, the LTMS agencies will continue to participate in the Dredged Material Reuse Project.
- The LTMS agencies will provide guidance on use of dredged material reuse projects.

¹ More specific engineering guidance and additional information regarding the issues and elements to consider in designing and implementing beneficial reuse projects can be obtained from the following LTMS documents: (1) LTMS. 1994a. *Engineering Conceptual Descriptions of Reuse Options*. Prepared by Gahagan & Bryant Associates, Inc. with ENTRIX, Inc.; (2) LTMS. 1995b *Reuse/Upland Site Analysis and Documentation, Feasibility Analyses of Four Sites (Volume II), Final*. Prepared by Gahagan & Bryant Associates, Inc. with ENTRIX, Inc. 102 pp. with appendices. (3) LTMS. 1995a. *Reuse/Upland Site Analysis and Documentation. Reuse/Upland Site Ranking, Analysis and Documentation (Volume I), Final Report*. Prepared by Gahagan & Bryant Associates, Inc. with ENTRIX, Inc. 410 pp. with appendices.

- To facilitate selection and implementation of Delta levee restoration projects using material from the Bay, the LTMS agencies will continue to work with local reclamation districts, local governments, Central Valley Regional Water Quality Control Board, and the State of California Department of Water Resources. To this end, the U.S. Army Corps of Engineers will pursue a Section 204 study regarding reuse of dredged material in the Delta. Further, the LTMS agencies will develop a strategy to improve coordination with CALFED, and, as a first step, the LTMS Management Committee will send a letter to the co-chairs of the CALFED Policy/Management Committee urging it to examine the potential for reuse of San Francisco Bay material in the Delta.
- To facilitate preliminary investigations and selection of beneficial reuse and disposal sites, the LTMS agencies will work with project proponents during the project planning stage to assess and select potential sites.
- The LTMS agencies will provide status reports regarding potential and/or existing beneficial reuse and disposal options through the LTMS Implementation Management Team workshops.

7.2.2 Dedicated Staff Position

- The primary LTMS agencies will create a new staff position whose sole responsibility will be to facilitate selection and implementation of beneficial reuse and disposal options for dredged material. The responsibilities of this position will include, but not be limited to, serving as the point of contact regarding reuse and disposal options, attending relevant meetings, and pursuing funding and legislative opportunities for project implementation.

7.2.3 Design of Wetland Creation and Restoration Projects

- The permitting agencies will work with project proponents during the design phase of wetland restoration projects using dredged material to ensure the development of biological goals and physical design features (including final fill elevations and material placement guidelines, appropriate physical and chemical characteristics of dredged material) to achieve these goals. Additionally, the LTMS permitting will require, as legally appropriate, that proposed restoration projects using dredged material include biological goals and appropriate physical design features to achieve these goals.
- The LTMS agencies will also include specific conditions in authorizations for dredged material reuse sites that stipulate appropriate design, operational features, and monitoring and remediation measures necessary to achieve biological goals at a given site.

7.2.4 Research Needs and Opportunities

- The LTMS agencies will foster, sponsor, or undertake, as resources allow, technical analyses of issues concerning wetland restoration using dredged material (e.g., suspended sediment

transport), and make scientific data available to project proponents and the public to improve the design and management of restoration sites.

7.2.5 Minimization of Habitat Conversion and Loss through Planning

- To ensure an ideal mix of wetland patterns and types and to minimize impacts of local habitat conversion, the LTMS agencies and wetland restoration-using dredged material-project sponsors will work to maximize the consistency of projects with applicable regional habitat goals (e.g., USFWS' Endangered Species Recovery Plans, the interagency San Francisco Bay Area Wetlands Ecosystem Goals Project, the San Francisco Bay Joint Venture, USEPA's North Bay Initiative, and BCDC's North Bay Wetlands Protection Program). As stated in the LTMS EIS/EIR: "the LTMS agencies will encourage and authorize as legally appropriate, restoration efforts using dredged material that are designed to be consistent, to the maximum extent practicable, with specific habitat goals established by regional planning efforts—with the understanding that such projects are dynamic, changing processes—for managing the region's natural resources." To this end, the LTMS agencies will require dredged material restoration proposals, as appropriate, to include an assessment of project consistency with regional habitat goal projects for the Estuary, and subsequently review such assessments to pursue consistency with such plans. However, the LTMS agencies will also work to ensure that the full range of Bay habitats is restored, as well as ensure that individual projects are consistent with regional goals.
- As stated in the LTMS EIS/EIR, for restoration projects using dredged material in areas not covered by established regional habitat goals, "the LTMS agencies will also encourage and authorize as legally appropriate, such projects which would clearly result in an overall net gain in habitat quality and would minimize loss of existing habitat functions. Whenever feasible, such projects will provide, as part of the project design, for a no net loss in the habitat functions existing on the project site or, where necessary, provide compensatory mitigation for lost habitat functions in accordance with state and federal mitigation requirements."
- The LTMS agencies recognize that temporal losses in existing habitat may occur at sites and will work with project proponents to minimize such losses. During the planning stage, project proponents should clearly define, evaluate, and, if feasible, incorporate existing habitat types at a potential beneficial reuse site. Moreover, proposed projects could be sited in areas that minimize loss of existing seasonal wetland habitat, where possible. Further, restoration projects could be designed to include restoration of seasonal and other important habitat types (e.g., the Hamilton Wetlands Restoration Project).
- Where possible, proposed rehandling facilities should be located in areas that minimize loss of existing wetland habitat or alternatively on sites located outside of the diked historic baylands with limited habitat value (e.g., developed or urbanized areas).
- During the planning stage, rehandling project proponents should, if feasible, incorporate wetland habitat values at proposed facilities by including individual ponds that could be

managed solely as habitat or by managing the facility as a habitat area during the season when dredged material is not processed at the site. Further, where necessary, project proponents should provide compensatory mitigation for lost habitat functions in accordance with state and federal mitigation requirements.

7.2.6 Long-Term Site Management Plans

- During the planning phase, project proponents should develop long-term management plans for beneficial reuse and disposal sites and appropriate mechanisms to ensure long-term, permanent protection of restored wetland values. In projects where significant existing wetland habitat is proposed to be impacted, project proponents could be required to develop mitigation goals specific to the project, monitor restoration over time, and, if necessary, remediate. Further, the LTMS agencies will fully and appropriately apply the existing laws, regulations and policies to ensure that any adverse impacts associated with the implementation of new projects will be minimized and, as necessary, mitigated.

7.2.7 Coordination with Appropriate Delta Entities

- For projects using material from San Francisco Bay to restore levees in the Delta, the LTMS agencies will continue to coordinate with the appropriate Delta agencies and authorities (e.g., California Department of Water Resources, local reclamation districts, the Central Valley Regional Water Quality Control Board, local governments) during the project design and implementation phases to ensure adequate protection of water quality in the Delta, and that placement of dredged material will not cause unacceptable contaminant-related (or other) effects.

7.2.8 Funding and Research to Develop Salinity Control Measures

- The LTMS agencies will work to address potential salinity impacts to the freshwater Delta environment associated with using Bay dredged material for levee restoration. As a part of this effort, the LTMS agencies will pursue funding and research opportunities to help understand how Bay dredged material affects the freshwater environment and plant and wildlife species of the Delta. Any data collected from such efforts and other “lessons learned” from initial Delta projects will be analyzed by the LTMS agencies, in coordination with appropriate Delta authorities, to determine the feasibility of subsequent projects in the Delta and to improve project design (including salinity control measures) and management.

7.3 BENEFICIAL REUSE AND DISPOSAL OPTIONS

7.3.1 Wetland Restoration

Wetland restoration projects involve placing dredged material at diked baylands, which have subsided below elevations suitable for the establishment of tidal wetland habitat. Dredged material can be used to raise existing elevations to allow wetland vegetation to establish, thereby accelerating the restoration process at these sites. Dredged material can also be used to create

elevated areas at restoration sites that will be above or inundated only during maximum high tides or above the reach of the tides; these tidal and seasonal wetlands would provide additional habitat diversity in areas where tidal wetland habitat was restored, reestablishing a more natural shoreline that can respond to sea level rise and other natural processes. At habitat restoration sites, dredged material can also be used to construct on-site berms, separate tidal and seasonal wetlands within a site, develop drainage control at areas not influenced by tidal action, and fill low areas where undesirable salt pans form (i.e., at duck clubs within managed wetland areas) (LTMS 1998).

Diked Historic Baylands v. “True” Upland Sites

In earlier phases of the LTMS, sites located outside the Bay where dredged material could be used beneficially (e.g., for habitat creation, construction fill, or levee restoration) were referred to as Upland/Wetland/Reuse or “UWR.” This earlier definition, however, made it difficult to differentiate between “true” uplands e.g., seasonal wetlands and other important habitats are found.

To better such areas, sites proposed for beneficial reuse that are located in diked historic baylands (e.g., wetland restoration projects) and not in “true” upland areas will be defined as “all areas that: (1) were historically part of San Francisco Bay, including the Bay’s marshlands as of 1850; (2) are hydrologically no longer part of San Francisco Bay or its marshlands, as a result of diking; (3) are not “salt ponds” or “managed wetlands”; (4) have not been filled; and (5) are not urbanized.” (BCDC 1982).

To date, dredged material has been used to restore tidal wetlands at Muzzi Marsh (Marin County), Faber Tract (Santa Clara County), and Salt Pond No. 3 (Alameda County).² More recently, tidal wetlands were restored using dredged material at the Sonoma Baylands site (Sonoma County).³ In the Delta region, dredged material has been used to restore wetlands at Donlin Island and Venice Cut (Sacramento County). Appendix M identifies potential wetland restoration projects (i.e., not currently available for disposal of dredged material but in the planning process).

The Hamilton Wetlands project (Marin County) will restore approximately 1,000 acres of diked baylands using over 10 million cubic yards (mcy) of dredged material. The pending inclusion of the Bel Marin Keys Parcel will expand the site to approximately 2,600 acres with a proportional increase in capacity. A joint project of the California Coastal Conservancy, BCDC, and the USACE, the Hamilton project will be constructed as a multi-user project with the principal goal of restoring a mix of wetlands habitat. A conceptual plan has been prepared by the state, a feasibility study has been completed by the USACE, and the environmental review is completed.

2 For more detailed analysis of these sites, see LTMS 1994c, A Review of the Physical and Biological Performance of Tidal Marshes Constructed with Dredged Material in San Francisco Bay, California, Draft Report. Prepared by Gahagan & Bryant Associates, Inc. with Bechtel Corporation, ENTRIX, Inc., and Philip Williams & Associates. 194 pp. with appendices.

3 The Sonoma Baylands project used a new design concept where dredged material was placed below the ultimate marsh plain allowing for natural on-site sedimentation during restoration. This design aspect was developed to reduce the potential of over-filling the restoration site.

Hamilton was authorized as a federal project in the 1999 Water Resources Development Act (WRDA) at a total cost of \$55 million. In addition to site preparation costs, the authorization will pay for the differential between open water disposal and reuse at Hamilton for federal projects. This funding removes a major impediment to beneficial reuse. The project is presently in final design and use of dredged material is projected to begin in 2002.

The Montezuma Wetlands Project (Solano County) will restore 2,000 acres of wetlands using approximately 17 mcy of dredged material. Unlike the Hamilton site, Montezuma will accept material that is not suitable for uncontained aquatic disposal. Montezuma is proposed as a private site that will charge a tipping fee for disposal. The project has completed environmental review; however, the EIR is presently under a court challenge.

- BCDC and the USACE will develop the Hamilton Wetlands project with the California Coastal Conservancy and all the LTMS agencies will continue to participate in the Hamilton Restoration Group.
- The LTMS agencies will continue to work with the project sponsor to resolve issues and process applications for implementation of the Montezuma Wetlands Project.

7.2.2 Rehandling Facilities and Potential End Uses

Rehandling facilities are typically located adjacent to the Bay where dredged material is transported, dried and/or processed (i.e., contaminant or salinity content diluted or removed), excavated, and, in most cases, eventually taken to an off-site location for use as landfill cover or construction material. Fine-grained materials (silts and clays)—the predominant material dredged from the Bay—and coarse-grained materials (cobbles, gravels, and sands) could be taken to rehandling facilities as well as unsuitable for unconfined aquatic disposal (NUAD) dredged material.

Prior to Reuse at Landfills

Project proponents should:

- (1) Contact landfill operators regarding site-specific Waste Acceptance Criteria
- (2) Inquire as to whether on-site drying facilities are available or investigate off-site rehandling options

In the Bay Area, rehandling facilities have been constructed as either temporary (e.g., Port of Oakland's Berth 10 facility) or permanent (e.g., Port Sonoma marina), and are typically comprised of a single or multiple cells where material is placed and dried. These existing facilities have been used to process relatively small volumes of material and/or material from specific dredging projects.

The clays and fine silts that comprise most dredged material from the Bay are often suitable for use as cover, capping, or lining material at landfills. The use of dredged material at landfills has high potential because landfills (1) need a large amount of material for daily cover and final capping; (2) typically have limited natural resource values; (3) are designed to contain contaminants and manage runoff; and (4) do not usually have adequate on-site sources of cover or capping material. Appendix M identifies existing and potential rehandling facilities (existing

facilities are identified on Figure 7.1). Most landfills cannot accept material until it has first been dried to acceptable moisture levels. Furthermore, most landfills do not have on-site drying facilities. Therefore, prior to delivery to and acceptance at a landfill, dredged material will need to be dried at an off-site rehandling facility. At this time, however, such facilities are limited in number and capacity in the Bay Area, and more are needed in order to facilitate reuse of dredged material at landfills (Appendix R).

- To facilitate selection and implementation of regional rehandling facilities and appropriate end uses, the LTMS agencies will continue to participate in the Dredged Material Reuse Project.

7.3.3 Levee Rehabilitation

The reclaimed islands and other low-lying areas of the Sacramento and San Joaquin River Delta region are surrounded by an 1,100-mile levee system that protect infrastructure (e.g., public highways, utility lines, private and public land uses, recreational areas), environmentally sensitive habitat, and the Delta's freshwater supply (i.e., by preventing salinity intrusion). Initially, the Delta levees were built with peat material taken from adjacent channels and sloughs. More recently, the levees have been constructed with materials containing a higher percentage of mineral soils from adjacent channels. The high organic matter of these materials together with an overall disparity in levee construction standards throughout the Delta have resulted in levee decomposition, subsidence and instability.⁴ In 1988, the Delta Flood Protection Act was passed (Senate Bill [SB] 34) which directed the DWR to develop and implement flood protection projects at eight western Delta islands.⁵ In 1994, the Federal Emergency Management Agency (FEMA) determined that 39 reclamation districts in the Primary Flood Control Zone of the Delta did not fully comply with the state's Flood Hazard Mitigation Plan, which outlines levee rehabilitation standards.

Material dredged from the Bay could be used to increase levee crests, toes, and landward slopes bringing existing levees up to modern design standards. The LTMS estimates indicate that approximately 26 mcy of dredged material could be used in the Delta over the next 50 years.⁶ Use of material dredged from the Bay in the Delta has been complicated by the potential for introduction of saline material into a freshwater environment. In addition, project coordination

4 Delta levees are characterized as either federal project levees or non-project levees. The federal project levees were constructed in relation to either a navigation or flood control project and are maintained by the State of California to federal standards. Non-project levees are classified as either private or direct-agreement levees. Private levees were privately constructed and are owner maintained; neither the state nor the federal government maintain jurisdiction over these levees. Direct-agreement levees are either private levees or under the jurisdiction of a local authority, such as a reclamation district, that are maintained by and through an agreement with the federal government, typically the USACE.

5 Sherman, Twitchell, Bradford, Webb, Bethel, and Jersey Islands, and the Hotchkiss and Holland tracts.

6 Although the use of dredged material for levee maintenance and stabilization has been found to be highly feasible in the Delta region, such uses of dredged material are also possible in other portions of the Planning Area. Access constraints, however, appear to be the limiting factor for such uses outside the Delta region. Therefore it is assumed that much of the dredged material used for levee maintenance and stabilization in the lower reaches of the Estuary will come from rehandling facilities rather than directly from dredging projects.

can be difficult given that those generating and regulating material from the Bay and those regulating and planning Delta reuse projects are not necessarily the same parties and do not usually have overlapping jurisdictions. Appendix S provides additional information regarding Delta regulatory and planning agencies.

Although existing regulatory and environmental concerns limit the use of Bay dredged material in the Delta, levees at Sherman, Twitchell, Jersey, and Winter Islands have been repaired with material from the Bay. These projects involved transporting material to the islands by barge and off-loading it either by clamshell or hydraulic pump.⁷ Typically, clamshell equipment involves positioning a barge 100 feet off the off-loading crane and in 200 feet of levee placement. Hydraulic off-loading usually involves placing the material into a temporary settling pond and stockpiling it until needed. Material placement could occur separately from or concurrent with off-loading. Dried material could also be transported to the levee repair site by truck or rail, if necessary. Appendix M identifies existing and potential levee restoration projects (existing projects are identified on Figure 7.1).

- To facilitate selection and implementation of Delta levee restoration projects using material from the Bay the LTMS agencies will continue to work with local reclamation districts, local governments, Central Valley Regional Water Quality Control Board, and the State of California Department of Water Resources. To this end, the U.S. Army Corps of Engineers will pursue a Section 204 study regarding reuse of dredged material at Sherman Island. Further, the LTMS agencies will develop a strategy to improve coordination with CALFED, and, as a first step, the LTMS Management Committee will send a letter to the co-chairs of the CALFED Policy/Management Committee urging it to examine the potential for reuse of San Francisco Bay material in the Delta.

7.3.4 Sub-tidal Habitat Creation

Dredged material can also be used to change the substrate or depth of sites within the Bay. Although this alternative was not considered as part of the LTMS technical studies, the Port of Oakland has proposed and studied the potential to take a former dredged area in the Oakland Middle Harbor and raise elevations suitable for the formation of eelgrass. Deeper areas of the Bay that have low light penetration do not support as high a level of primary production as shallower areas. Eelgrass, in particular, only grows in shallow areas of the Bay having suitable environmental conditions. Carefully designed and constructed projects could provide habitat benefits of higher productivity or growth of eelgrass. Similar to reuse in diked baylands these projects will impact existing habitat and site conditions as discussed below. Because much of the Bay is already fairly shallow and because there are only limited areas potentially suitable for eelgrass projects in the Bay, such projects likely will be limited in number.

⁷ Optimum channel depth for waterside access is a minimum of 15 feet MLLW.

7.4 BENEFICIAL REUSE AND DISPOSAL PROJECT PLANNING AND IMPLEMENTATION ISSUES

The use of dredged material to restore wetlands, provide cover and construction material to landfills and other facilities, rehabilitate levees, and create sub-tidal habitat will result in important benefits to the region as well as help to accomplish the LTMS goals. It is possible, however, that such projects will have the potential to impact certain sites (such as conversion of existing wildlife habitat). Therefore, individual projects will require site specific analysis and design, and separate environmental and regulatory review pursuant to the California Environmental Quality Act (CEQA) and/or the National Environmental Policy Act (NEPA). Although each project will be unique, there are some general issues regarding potential projects that project proponents will likely need to consider during the planning and implementation phases, as discussed below.

7.4.1 Site Selection and Evaluation

A variety of beneficial reuse and disposal sites currently exist in the region. However, most are not equipped to accept material from multi-users and instead have generally been used for material from a single previously-designated source. Potential beneficial reuse sites that could be developed as regional facilities and thus be equipped to take material from a variety of sources have been identified through the LTMS and other efforts (e.g., the Dredged Material Reuse Project [DMRP]). Because of the costs and time involved, most dredgers seeking a beneficial reuse or disposal option will likely not design or implement a new site, but instead will use one of the existing or potential options (Appendix M). If available, for regional use or projects undertaken at a demonstration-level to address or resolve outstanding issues (e.g., potential water quality impacts associated with using Bay [i.e., saline] dredged material in a freshwater environment [i.e., the Delta]); this will require that regional beneficial reuse and disposal option planning efforts continue into the future.

In the event, however, a project proponent wishes to conduct a preliminary evaluation of potential sites, a site ranking system developed through the LTMS could be used by project proponents or sponsors.⁸ Further, in developing site-specific assessments of potential beneficial reuse projects using dredged material, project proponents should consider and analyze certain elements common to projects identified in the individual tables contained in Appendix N.⁹

8 For more information about the LTMS site ranking system, project proponents should refer to LTMS. 1995b Reuse/Upland Site Analysis and Documentation, Feasibility Analyses of Four Sites (Volume II), Final. Prepared by Gahagan & Bryant Associates, Inc. with ENTRIX, Inc. 102 pp. with appendices. (3) LTMS. 1995a. Reuse/Upland Site Analysis and Documentation. Reuse/Upland Site Ranking, Analysis and Documentation (Volume I), Final Report. Prepared by Gahagan & Bryant Associates, Inc. with ENTRIX, Inc. 410 pp. with appendices. It should be noted that the LTMS site ranking system database cannot be used for selecting potential sub-tidal habitat creation sites since this reuse option was not considered during the earlier stages of the LTMS when the database was created.

9 It should be noted that these same issues would be considered and analyzed by the lead agency(ies) during the environmental review (per CEQA and/or NEPA) and permitting stages.

To facilitate selection and implementation of beneficial reuse or disposal options, the LTMS agencies propose the following implementation measures:¹⁰

- The dredging and environmental communities will work to implement and fund beneficial reuse projects.
- To implement wetland restoration using dredged material, the BCDC and USACE will develop the Hamilton Wetlands project with the California Coastal Conservancy and all the LTMS agencies will continue to participate in the Hamilton Restoration Group.
- To facilitate selection and implementation of regional rehandling facilities and appropriate end uses, the LTMS agencies will continue to participate in the Dredged Material Reuse Project.
- The LTMS agencies will provide guidance on use of dredged material reuse projects.
- To facilitate preliminary investigations and selection of beneficial reuse and disposal sites, the LTMS agencies will work with project proponents during the project planning stages to assess and select potential sites.
- The LTMS agencies will provide status reports regarding beneficial and/or existing beneficial reuse and disposal options projects through LTMS Implementation Management Team Workshops.
- The primary LTMS agencies will create a new staff position whose sole responsibility will be to facilitate selection and implementation of beneficial reuse and disposal options for dredged material. The responsibilities of this position will include, but not be limited to serving as the point of contact regarding reuse and disposal options, attending relevant meetings, and pursuing funding and legislative opportunities for project implementation.

7.4.2 Wetland Restoration Physical Design and Biological Goals

The ultimate goal of wetland restoration is to support Bay plant and animal species and migratory animals, birds and fish in a stable, functioning ecosystem. During the design phase of reuse projects, clearly defined biological goals should first be determined by the project proponent for use in developing physical design features (e.g., salinity regimes, topographic gradients, slough system development) needed to achieve these goals. The goals will improve the success of projects in providing target habitat values and help identify when and how changes in project design or other remediation measures are needed to improve the restoration project (LTMS

¹⁰ In addition to measures proposed by the LTMS agencies, to date the LTMS stakeholders have committed to take the following steps in order to facilitate selection and implementation of Delta reuse sites: (1) Bay Planning Coalition will pursue legislator (Pat Johnston) support for Delta reuse; (2) DWR will coordinate and hold a summit meeting with the various stakeholders to develop a partnership on Delta reuse funding; and (3) Save San Francisco Bay Association will prepare a briefing for CALFED regarding Delta reuse of Bay material.

EIS/EIR). Additionally, the success of restoration projects depends in part on a better understanding of how to develop such projects. This will come in part from improved technical data regarding certain aspects of restoration. Currently, the U.S. Geological Survey (USGS) is conducting a study, Meteorological and Flow Variability at Wetland Sites in the San Francisco Bay Ecosystem, which will provide data regarding suspended sediment transport associated with wetland restoration efforts in the Estuary.¹¹

To facilitate successful wetland restoration at sites using dredged material, the LTMS agencies propose the following implementation measures:

- The permitting agencies will work with project proponents during the design phase of wetland restoration projects using dredged material to ensure the development of biological goals and physical design features (including final fill elevations and material placement guidelines, appropriate physical and chemical characteristics of dredged material) to achieve these goals. Additionally, the LTMS permitting agencies will require, as legally appropriate, that proposed restoration projects using dredged material include biological goals and appropriate physical design features to achieve these goals.
- The LTMS agencies will also include specific conditions in authorizations for dredged material reuse sites that stipulate appropriate design, operational features, and monitoring and remediation measures necessary to achieve biological goals at a given site.
- The LTMS agencies will foster, sponsor, or undertake, as resources allow, technical analyses of issues concerning wetland restoration using dredged material (e.g., suspended sediment transport), and make scientific data available to project proponents and the public to improve the design and management of restoration sites.

7.4.3 Habitat Conversion or Loss and Regional Habitat Goals

Although projects such as habitat restoration using dredged material would be geared primarily towards habitat enhancement, implementation of certain beneficial reuse and disposal projects could result in the conversion or loss of existing habitat, and the loss of important habitat functions for local and migratory shorebirds and waterfowl (including supplemental foraging habitat during high tides for small shorebirds, nesting habitat for resident species, and winter storm refugia). In the case of dredged material reuse at landfills and at existing rehandling facilities, habitat conversion or loss is a minor issue in light of the already disturbed nature of

11 The study focuses on developing a quantitative model of suspended sediment concentrations brought about by wind, wave, and current forces present at various San Francisco Bay wetlands. One of the study locations is the outboard marsh along the eastern edge of the former Hamilton Army Airfield. Instrument packages include meteorological measurements consisting of wind shear, wind direction, barometric pressure, and air temperature; and sediment flux measurements consisting of current and suspended sediment, as well as water temperature, salinity, and current direction and strength. The other study areas include two sites associated with the San Francisco Bay National Wildlife Refuge in South San Francisco Bay and outboard of the Sonoma Baylands Wetland Restoration Project. (LTMS 1998)

these sites and resultant limited habitat value.¹² Habitat conversion or loss takes on greater significance in the case where diked historic baylands are used for habitat restoration and the construction or expansion of a new rehandling facility and where material is used to restore levees.¹³ Projects proposed in the Bay are of particular concern given the high value of most existing Bay habitats and the historic loss of Bay habitat.

Beneficial reuse sites could directly impact protected and/or listed species existing on-site (Appendix F lists potential existing protected and/or listed species). In addition, beneficial reuse and disposal projects could impact adjacent off-site habitat (e.g., existing tidal marsh that will be scoured upon breaching of outboard perimeter levees), and produce localized and short-term impacts resulting in interference with and stress in wildlife behavior or habitat abandonment.

To avoid potential loss of important habitat types such as seasonal wetlands, the LTMS agencies propose the following implementation measures:

- To ensure an ideal mix of wetland patterns and types and to minimize impacts of local habitat conversion, the LTMS agencies and wetland restoration using dredged material project sponsors will work to maximize the consistency of projects with applicable regional habitat goals (e.g., USFWS's Endangered Species Recovery Plans, the interagency San Francisco Bay Area Wetlands Ecosystem Goals Project, the San Francisco Bay Joint Venture, USEPA's North Bay Initiative, and BCDP's North Bay Wetlands Protection Program). As stated in the LTMS EIS/EIR: "the LTMS agencies will encourage, and authorize as legally appropriate, restoration efforts using dredged material that are designed to be consistent, to the maximum extent practicable, with specific habitat goals established by regional planning efforts—with the understanding that such projects are dynamic, changing processes—for managing the region's natural resources." To this end, the LTMS agencies will require dredged material restoration proposals, as appropriate, to include an assessment of project consistency with regional habitat goal projects for the Estuary, and subsequently review such assessments to pursue consistency with such plans. However, the LTMS agencies will also work to ensure that the full range of Bay habitats are restored, and that individual projects are consistent with regional goals.
- As stated in the LTMS EIS/EIR for restoration projects using dredged material in areas not covered by established regional habitat goals, "the LTMS agencies will also encourage and authorize as legally appropriate, such projects which would clearly result in an overall net gain in habitat quality and would minimize loss of existing habitat functions. Whenever feasible, such projects will provide, as part of the project design, for a no net loss in the

12 However, it should be noted that several existing rehandling facilities (e.g., the City of Petaluma's and the City of San Leandro's ponds) serve an important habitat function during the periods in which the ponds are not actively used for rehandling and are managed solely for wildlife use.

13 Other possible impacts on wildlife—as well as human—receptors associated with beneficial reuse and disposal operations include noise—associated with tugboats, scows, pump-out barges, trucks and trains used to transport dredged material, transfer station pumps, and construction and operation equipment, traffic that would be associated with transporting material to and from (if taken to an end-use location) sites, and air quality.

habitat functions existing on the project site or, where necessary, provide compensatory mitigation for lost habitat functions in accordance with state and federal mitigation requirements.”

- The LTMS agencies recognize that temporal losses in existing habitat may occur at sites and will work with project proponents to minimize such losses. During the planning stage, project proponents should clearly define, evaluate, and, if feasible, incorporate existing habitat types at a potential beneficial reuse site. Moreover, proposed projects could be sited in areas that minimize loss of existing wetland habitat, where possible. Further, restoration projects could be designed to include restoration of seasonal and other important habitat types (e.g., the Hamilton Wetlands Restoration Project).
- Where possible, proposed rehandling facilities should be located in areas that minimize loss of existing wetland habitat or alternatively on sites with limited habitat value located outside of the Bay and diked historic baylands (e.g., developed or urbanized areas).
- During the planning stage, rehandling project proponents should, if feasible, incorporate wetland habitat values at proposed facilities such as by including individual ponds that could be managed solely as habitat or by managing the facility as a habitat area during the season when dredged material is not processed at the site. Further, where necessary, project proponents should provide compensatory mitigation for lost habitat functions in accordance with state and federal mitigation requirements.
- During the planning phase, project proponents should develop long-term management plans for beneficial reuse and disposal sites and appropriate mechanisms to ensure long-term, permanent protection of restored wetland values. In projects where significant existing wetland habitat is proposed to be impacted, project proponents could be required to develop mitigation goals specific to the project, monitor restoration over time, and, if necessary, remediate. Further, the LTMS agencies will fully and appropriately apply the existing laws, regulations and policies to ensure that any adverse impacts associated with the implementation of new projects will be minimized and, as necessary, mitigated.

7.4.4 Contaminant and Salinity Exposure and Mobility

The beneficial reuse of dredged material could potentially result in the release of contaminants or salt to on-site surface waters, groundwater, and off-site receiving waters (from any surface or drainage water). Additionally, dredged material could undergo a change in pH due to oxidation of material following placement, and acidification of material may solubilize metals that would otherwise be stable and bound to the sediment in its previous anoxic aquatic environment.¹⁴

¹⁴ The way that sediment oxidation affects heavy metal release is not completely understood. Recent research conducted by the USACE at the Waterways Experiment Station on John F. Baldwin Ship Channel sediments indicated that concentrations of heavy metals contained in material subjected to experimentally controlled upland placement and simulated rainfall had statistically reduced metals in runoff samples after drying and oxidation compared to material maintained under anoxic conditions. Additionally, most of the metals within the material that were allowed to oxidize remained bound to particulate

Further, these constituents (including dust) could be released during initial placement and from earth-moving activities (during site preparation, construction, and/or maintenance) as well as along transportation routes to or from the reuse site.¹⁵

In accordance with state and federal regulatory requirements, landfills have been constructed with drain/leachate systems to collect contaminants. Rehandling facilities would also be designed to process dredged material while ensuring the isolation of material and the collection and containment of contaminants (including salinity). Further, any water discharged from these sites would be required to meet state and federal standards set by law. As such, contaminant mobility at these sites would likely be a nominal issue.

The Jersey Island levee restoration project (1995-1996) did not reveal any significant water quality impacts which ensured in part that water discharged from the site met the established CVRWQCB water quality standards. In addition, the CVRWQCB issued Waste Discharge Requirements (WDRs) for the site, which included a site monitoring plan designed to address questions regarding potential salinity and other contaminant release and migration associated with the use of dredged material. Nevertheless, the potential salinity impacts from Bay dredged material on the freshwater Delta environment will continue to be an issue of concern.

All sediments will be required to be adequately characterized for the proposed placement or disposal site, using appropriate physical, chemical, and biological testing methods. Further, sediment quality evaluations will include consideration of potential effects related to the specific pathways of concern identified for the proposed placement site. Lastly, authorizations from the LTMS agencies will include appropriate design or operational features necessary to control all contaminant pathways of concern at a given site, and be adequate to manage the worst-case material considered for placement at a site. Moreover, all material and any discharged water will meet the waste discharge and monitoring requirements of the appropriate Regional Board prior to any drainage water release from the site.

In order to avoid or reduce the release of these constituents from sites and the potential impacts to habitats and sensitive receptors, the LTMS agencies propose the following implementation measures:

- For projects using material from the San Francisco Bay to restore levees in the Delta, LTMS agencies will continue to coordinate with the appropriate Delta agencies and authorities (e.g., California Department of Water Resources, local reclamation districts, the Central Valley Regional Water Quality Control Board, local governments) during the project design and

matter and were therefore considered insoluble. Such studies do not fully address this potential impact and further research is needed (LTMS 1998).

¹⁵ Additionally, the placement of dredged material in a fresh water setting in the Delta also poses concerns regarding bromide ions. Bromide is a constituent of total dissolved solids (TDS) and is found in higher concentrations in sea water than fresh water. Bromide is a concern in regard to municipal water supplies. When water containing bromide is chlorinated for use as drinking water, trihalomethane (THM) compounds are created. Regulated under federal drinking water standards, the increased THM levels may result in water that exceeds state or federal drinking water standards for THM content.

implementation phases to ensure adequate protection of water quality in the Delta, and that placement of dredged material will not cause unacceptable contaminant-related (or other) effects.

- The LTMS agencies will work to address potential salinity impacts to the freshwater Delta environment associated with using Bay dredged material for levee restoration. As a part of this effort, the LTMS agencies will pursue funding and research opportunities to help understand how Bay dredged material affects the freshwater environment and plant and wildlife species of the Delta. Any data collected from such efforts and other “lessons learned” from initial Delta projects will be analyzed by the LTMS agencies and appropriate Delta authorities to determine the feasibility of subsequent projects in the Delta and to improve project design (including potential salinity control measures), and management.
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